Claims

1. Recombinant bacteria, comprising
a) at least one nucleic acid sequence functionally coupled to a prokaryotic, chloride-inducible promoter and encoding for at least one heterologous factor having a therapeutic and/or preventive effect in a subject, preferably after application of the recombinant bacteria to said subject, said heterologous factor is independently a heterologous polypeptide, or a complex thereof, and
b) at least one prokaryotic regulator gene, which controls activity of said chloride-inducible promoter,
wherein said heterologous polypeptide comprises at least one eukaryotic polypeptide, at least one fragment thereof or a combination thereof.

2. A recombinant nucleic acid, comprising
a) at least one nucleic acid sequence functionally coupled to a prokaryotic, chloride-inducible promoter and encoding for at least one heterologous factor having a therapeutic and/or preventive effect in a subject, said heterologous factor is independently a heterologous polypeptide, or a complex thereof, and
b) at least one prokaryotic regulator gene controlling activity of said chloride-inducible promoter,
wherein said heterologous polypeptide comprises a eukaryotic polypeptide, at least one fragment thereof or a combination thereof.

3. The recombinant bacteria according to claim 1, wherein said at least one nucleic acid sequence functionally coupled to a prokaryotic, chloride-inducible promoter and encoding for at least one heterologous factor and/or said at least one procaryotic regulator gene, which controls activity of said chloride-inducible promoter, is/are each independently located on a chromosome and/or at least one plasmid of said recombinant bacteria.

4. The recombinant bacteria according to any one of claims 1 or 3 or the recombinant nucleic acid according to claim 2, wherein said chloride-inducible promoter and/or said at least one regulator gene is/are each independently from a, preferably gram-positive or gram-negative, bacterial species.

5. The recombinant bacteria according to any one of claims 1, or 3 to 4 or the recombinant nucleic acid according to any one of claims 2 or 4, wherein said chloride-inducible promoter is PgadC from a bacterial species of the taxonomic order Lactobacillales, preferably Lactococcus lactis.

6. The recombinant bacteria according to any one of claims 1, or 3 to 4 or the recombinant nucleic acid according to any one of claims 2 or 4, wherein said regulator gene encodes for gadR from a bacterial species of the taxonomic order Lactobacillales, preferably Lactococcus lactis.

7. The recombinant bacteria according to any one of claims 1, or 3 to 6 or the recombinant nucleic acid according to any one of claims 2, or 4 to 6, wherein said chloride-inducible promoter and said at least one regulator gene are arranged in a chloride-inducible gene expression cassette, wherein said chloride-inducible promoter is arranged downstream from said at least one regulator gene, and wherein said chloride-inducible gene expression cassette controls transcription of the at least one nucleic acid sequence encoding for the at least one heterologous factor.

8. The recombinant bacteria or the recombinant nucleic acid according to claim 7, wherein said chloride-inducible gene expression cassette comprises or consists of the nucleic acid sequence of SEQ ID No 2 and controls transcription of the at least one nucleic acid sequence encoding for the at least one heterologous factor.

9. The recombinant bacteria according to any one of claims 1, 3, or 7 to 8 or the recombinant nucleic acid according to any one of claims 2, or 7 to 8, wherein said at least one heterologous factor is a heterologous polypeptide or complex thereof each comprising at least one eukaryotic polypeptide, at least one fragment thereof or a combination thereof.

10. The recombinant bacteria according to any one of claims 1, 3, or 7 to 9 or the recombinant nucleic acid according to any one of claims 2, or 7 to 9, wherein said at least one heterologous factor is selected from the group consisting of polypeptide hormones, growth factors, cytokines, chemokines, enzymes, neuropeptides, antibodies, precursors thereof, fragments thereof and combinations thereof from an eukaryotic species, preferably a mammalian species, further preferably human.

11. The recombinant bacteria according to any one of claims 1, or 3 to 10, further comprising at least one inactivated gene encoding for an essential protein necessary for viability of the recombinant bacteria.

12. Recombinant bacteria according to claim 11, wherein said gene encoding for an essential protein is inactivated by deletion of said gene, mutation of said gene, RNA interference (RNAi) mediated gene silencing of said gene, translational inhibition of said gene, or combinations thereof.

13. The recombinant nucleic acid according to any one of claims 2, or 4 to 10, further comprising at least one gene encoding for an essential protein necessary for viability of a recombinant bacteria.

14. The recombinant bacteria according to any one of claims 11 to 12 or the recombinant nucleic acid according to claim 13, wherein said at least one gene necessary for viability is selected from the group consisting of alanine racemase (alr), thymidylate synthase (thyA), asparagine synthase (asnH), CTP synthase (pyrG), tryptophan synthase (trpBA), and combinations thereof.

15. The nucleic acid according to any one of claims 2, 4 to 10, 13, or 14 wherein said recombinant nucleic acid is in the form of a plasmid.

16. Recombinant bacteria according to any one of claims 1, 3 to 12, or 14, comprising at least one recombinant nucleic acid according to any one of claims 2, 4 to 10, 14 or 15.

17. Recombinant bacteria according to any one of claims 1, 3 to 12, 14 or 16, wherein said recombinant bacteria are non-pathogenic bacteria.

18. Recombinant bacteria according to any one of claims 1, 3 to 12, or 14 to 17, wherein said recombinant bacteria are recombinant bacteria, preferably lactic acid bacteria, further preferably lactobacillus or lactococcus species.

19. Recombinant bacteria according to any one of claim 18, wherein said lactococcus species *is Lactococcus lactis,* preferably *Lactococcus lactis* subspecies cremoris.

20. Recombinant bacteria according to any one of claims 1, 3 to 12, 14 or 16 to 20, for use in medicine.

21. Use of recombinant bacteria according to any one of claims 1, 3 to 12, 14 or 16 to 20 in the manufacture of a medicament for the treatment of a, preferably chronic, inflammatory wound.

22. Use of recombinant bacteria according to any one of claims 1, 3 to 12, 14 or 16 to 20, in the manufacture of a medicament for the treatment of a tumor, preferably a malignant tumor.

23. A pharmaceutical composition comprising recombinant bacteria according to any one of claims 1, 3 to 12, 14 or 16 to 20 and at least one pharmaceutically acceptable excipient.

24. Kit for use in medicine, comprising
a) recombinant bacteria according to any one of claims 1, 3 to 12, 14 or 16 to 20, capable of expressing the at least one heterologous factor under the control of the prokaryotic, chloride-inducible promoter, and
b) at least one inducer comprising chloride ions.

25. A medical device, comprising
a) recombinant bacteria according to any one of claims 1, 3 to 12, 14 or 16 to 20, capable of expressing the at least one heterologous factor under the control of the prokaryotic, chloride-inducible promoter.

26. The pharmaceutical composition according to claim 23 or the kit according to claim 24 or medical device according to claim 25, wherein said recombinant bacteria are in solution, frozen, or dried, preferably lyophilised or spray dried.

27. The pharmaceutical composition according to any one of claims 23 or 26 or the kit according to any one of claims 24 or 26 or medical device according to any one of claims 25 or 26, wherein said recombinant bacteria are reconstituted in a liquid, preferably culture medium, comprising chloride ions.

28. Kit according to according to any one of claims 24, 26, or 27, wherein the kit is provided as a combined preparation for separate, sequential or simultaneous use in treatment of a, preferably chronic, inflammatory wound.

29. Kit according to according to any one of claims 24, 26, or 28 wherein the kit is provided as a combined preparation for separate, sequential or simultaneous use in treatment of a tumor, preferably a malignant tumor.

30. Use of a reconstitution medium comprising chloride ions to reconstitute recombinant bacteria according to any one of claims 1, 3 to 12, 14 or 16 to 19.